



## Risk moderation of a parent and student preventive alcohol intervention by adolescent and family factors: A cluster randomized trial



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### ABSTRACT

**Objective:** To examine risk moderation of an alcohol intervention targeting parents and adolescents.

**Design:** A cluster randomized trial including 2937 Dutch early adolescents ( $m = 12.68$  years,  $SD = 0.51$ ) and their parents randomized over four conditions: parent intervention, student intervention, combined parent–student intervention, and control group.

**Setting:** 152 classes of 19 high schools in The Netherlands (2006).

**Method:** Moderators at baseline (adolescent: gender, educational level and externalizing behavior; parent: educational level and heavy alcohol use) were used to examine the differential effects of the interventions on onset of (heavy) weekly drinking at 22-month follow-up.

**Results:** The combined intervention effectively delayed the onset of weekly drinking in the general population of adolescents, and was particularly effective in delaying the onset of heavy weekly drinking in a higher-risk subsample of adolescents (i.e. those attending lower levels of education and reporting higher levels of externalizing behavior).

**Conclusion:** Present and previous results have established the combined intervention to be universally effective in postponing weekly alcohol use among Dutch adolescents, with an added effect on postponing heavy weekly drinking in high risk subgroups. Therefore, implementation of this intervention in the general population of schools in The Netherlands is advised.

Trial registration: NTR649

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### Introduction

In the last decades, various programs have been developed to prevent early drinking in adolescents. These programs mainly focused on the adolescents themselves (i.e. school interventions), their parents or a combined parent and adolescent approach (i.e. family interventions, Spoth et al., 2008a). Many of these programs showed actual effects on early adolescent alcohol consumption, with significant findings across the targeted general population of adolescents and their parents (Smit et al., 2008; Spoth et al., 2008a). Relatively little attention, however, has been paid to the question whether all adolescents benefit from these interventions to the same extent. Interventions may have differential effects on different groups of adolescents, and may be particularly effective or ineffective among specific subgroups (Kraemer et al., 2002). Especially, investigation of risk-related moderator effects is important as it can establish whether groups at higher risk may be more likely to benefit from the intervention than groups at lower risk, as they are

more inclined to develop the targeted behavior (Spoth et al., 2006; Stice et al., 2009). In addition, the risk moderation hypothesis (Spoth et al., 2006) suggests that groups at higher risk for drinking are expected to respond better to the intervention, as the information received is more applicable to them. Therefore, testing risk moderation of universal prevention programs is required to evaluate whether interventions designed for general populations indeed have positive effects across both high and low risk subgroups (Kraemer et al., 2006; Spoth et al., 2006). In addition, investigating the moderation factors of intervention outcomes is critically important for theoretical as well as practical implementation purposes (Brown et al., 2008). Insight into differential effects across subgroups might contribute to the development of group-specific programs which makes it possible to tailor interventions to the needs of different subgroups (e.g. D'Amico et al., 2004).

Recently, a Dutch school-based multi-component prevention program (PAS) demonstrated to effectively postpone the onset of drinking in early adolescents (12 to 14 years) when adolescents as well as their parents were targeted (Koning et al., 2009). However, no effects were found for the interventions directed at either the parents or the students when carried out separately. The purpose of the current study is to examine the role of different potential risk moderators of this universal

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prevention program. On the basis of previously reported moderators in the literature (e.g. Barnett et al., 2010; Koutakis et al., 2008; Voogt et al., 2013; Winters et al., 2008), we identified demographic variables (gender and level of education), adolescent behavioral characteristics (externalizing behavior) and characteristics of the environment (parental alcohol use) as possible moderators. Gender is a potential risk moderator, as boys are at a higher risk for weekly drinking than girls (Gruber et al., 1996; Monshouwer et al., 2008). However, previous studies that have examined the effectiveness of alcohol interventions across genders showed mixed results, varying from more benefits among boys (Vigla-Taglianti et al., 2009), comparable effects for both genders (Jones et al., 2005; Koutakis et al., 2008; Kulis et al., 2007; Trudeau et al., 2003) and more benefits among girls (Lillehoj et al., 2004; Trudeau et al., 2007). Possible explanations for these mixed results could be the differences in targeted age groups, in the type of intervention (school/family), and in the outcome measures used in these studies. Another known risk factor for adolescent drinking is a low educational level. Adolescents with a lower educational level tend to drink more alcohol than higher educated adolescents (Crum et al., 1998; Van Dorsselaer et al., 2007; Vereecken et al., 2004). In addition, parents with a lower educational level are more likely to approve of the use of alcohol by their offspring (Bogenschneider et al., 1998; Verdurmen et al., 2008) and tend to set less restrictive rules (Spijkerman et al., 2008), factors that have been found to be related to higher adolescent alcohol use (Van der Vorst et al., 2006). However, to our knowledge, no studies are available that have examined the level of education of adolescents or parents as a moderator for alcohol prevention outcomes.

A third possible risk moderator is adolescent externalizing behavior. Externalizing behavior and alcohol use often co-occur among adolescents, in which externalizing behavior mostly precedes the use of alcohol (Bui et al., 2000; Engels et al., 2005; Mason et al., 2003). A study among adolescents in treatment for substance use disorders found worse treatment outcomes among adolescents exhibiting externalizing behavior at baseline compared to adolescents not exhibiting this behavior (Winters et al., 2008). Yet, Koutakis et al. (2008) demonstrated that their parental alcohol intervention (on which our parent intervention is based) is more effective in deterring delinquent behavior at follow-up among adolescents with more delinquent behavior at baseline. Yet, moderation by delinquency for alcohol use as an outcome measure was not reported. No other studies examining the moderation effects of externalizing behavior in alcohol prevention programs were found.

Finally, parental alcohol use may be considered a potential risk moderator, as previous studies have shown parental alcohol use to be related to the alcohol use of their children, even after controlling for alcohol-specific parenting practices (van der Zwaluw et al., 2008; Latendresse et al., 2008).

### The current study

The current study examined risk moderation of an alcohol intervention targeting parents and adolescents. In a cluster randomized trial, the effects were measured for onset of weekly drinking (WD) and heavy weekly drinking (HWD) at the 22 month follow-up in a sample of 2937 adolescents and their parents. Based on previous studies showing larger effects of preventive interventions in groups at higher risk of exhibiting the targeted behavior (i.e. Kellam et al., 1998; Koutakis et al., 2008; Spoth et al., 2008b; Stice et al., 2009), we expected the effects of the PAS intervention to be larger for boys, adolescents with a lower educational level, with lower educated parents, adolescents with a higher level of externalizing behavior, and with heavy drinking parents.

## Method

### Procedure and participants

In April 2006, 80 schools were randomly selected from the list of all public secondary schools, and were invited to participate in the study if the following

inclusion criteria were met: 1) at least 100 first year students, 2) <25% students from migrant populations (alcohol use is not very common among immigrant groups; Monshouwer et al., 2003), and 3) not offering special education (often complex and serious behavioral problems; Kepper et al., 2013). A total of 20 schools were willing to participate. For details on power calculations we refer to Koning et al., 2009.

In The Netherlands, from the first year of secondary school, when most pupils are 12–13 years of age, the educational system is already highly differentiated. Depending on their teacher's advice and the results of a test in the last year of primary education pupils enter different types of secondary education. The educational levels are: pre-vocational education, lower general secondary education, upper-general secondary education and pre-university education. As many high schools distinguish between pre-vocational and lower secondary education, and higher secondary and pre-university levels of education, in the current study we used this distinction in dichotomizing the level of education. For implementation reasons it is important to understand the differential effects of the intervention across these two groups of educational levels.

Both students and their parents were involved in this study, but students were the unit of analysis. Student data were collected by trained research assistants in their classrooms using online questionnaires, available on a secured website. Questionnaires for parents were sent to their home address, together with a letter of consent. This letter informed parents about the participation of the school in the project and parents were given the opportunity to refuse participation of their child (0.01% refusal). A written reminder followed the questionnaire three weeks later; after another two weeks, non-responding parents were contacted by telephone. Both parental and student data were gathered in September/October 2006, before any intervention was carried out, and again 10 and 22 months later (June/July 2007/2008).

### Randomization

An independent statistician assigned the participating schools randomly to one of the following conditions: 1) parent intervention, 2) student intervention, 3) combined parent–student intervention, and 4) control condition. Randomization was carried out centrally, using a blocked randomization scheme (block size 5) stratified by level of education, with the schools as units of randomization. Within each participating school, all first-year students participated in the intervention. After randomization, one school could not participate because of reasons unrelated to the study. This school was randomized originally to the control condition. The trial protocol (NTR649) was approved by the medical ethical committee.

### Interventions

#### Parent intervention (PI)

This intervention was modeled after a Swedish intervention, The Örebro Prevention program (see Koutakis et al., 2008) and targets parental rules for their children's alcohol use. The intervention was carried out at the first parents' meeting (>80% attendance rate) at the beginning of years 1 and 2 (September/October 2006 and 2007) and consists of three elements. First, in the regular parents' meeting, a short presentation (15 min) was given containing information on the adverse effects of alcohol use at a young age, and the effects of permissive parental attitudes towards children's alcohol use. Second, after the plenary meeting, the parents of students in the same class joined the mentor of that class in a class meeting to discuss rules and to reach a consensus on a set of shared rules (10–20 min). Third, an information leaflet with a summary of the presentation and a report of the outcome of the class meeting was prepared and sent to parents' home addresses. This way, all parents included in the intervention were informed about the content of the parents meeting.

#### Student intervention (SI)

The SI is a renewed digital alcohol module based upon the alcohol module of the well established Healthy School and Drugs (HSD) Dutch prevention program. The current SI is based on principles of the theory of planned behavior (Ajzen and Fishbein, 1980) and social cognitive theory (Bandura, 1996) and targets adolescents' self-control and healthy attitude towards alcohol use. After receiving training, the teachers conducted the intervention (four lessons, 50 min each) in all first year classes in year 1 (March/April 2007). A hard-copy booster session (one lesson, 50 min) was provided one year later in March/April 2008. The student intervention was carried out in the classroom, therefore all students (except those being ill or absent for another reason) participated in the intervention.

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